KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

VS-48HDCPxl
4x8 DVI Matrix Switcher

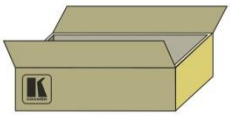
P/N: 2900-300015 Rev 5

VS-48HDCPxl Quick Start Guide

This guide helps you install and use your product for the first time. For more detailed information, go to http://www.kramerelectronics.com/support/product_downloads.asp to download the latest manual or scan the QR code on the left.

Step 1: Check what's in the box

- ☑ **VS-48HDCPxl** 4x8 DVI Matrix Switcher
- ☑ 1 Power cord
- ☑ Rack "ears"
- ☑ 4 Rubber feet
- ☑ 1 Quick Start sheet
- ☑ Kramer **RC-IR3** Infrared Remote Control Transmitter with batteries and user manual



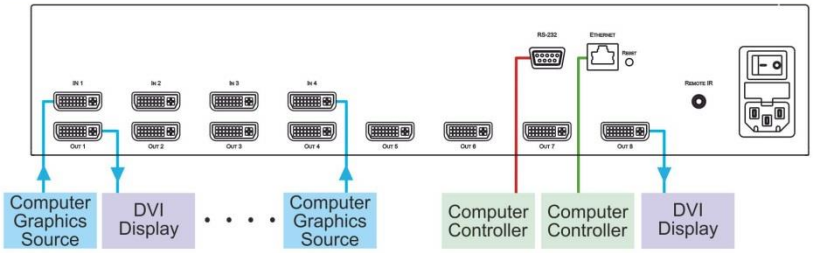
Save the original box and packaging materials in case you need to return your **VS-48HDCPxl** for service.

Step 2: Install the VS-48HDCPxl

Mount the **VS-48HDCPxl** in a rack (using the included rack "ears") or attach the rubber feet and place on a table.

Step 3: Connect the inputs and outputs

Always switch off the power on each device before connecting it to your **VS-48HDCPxl**.



Always use Kramer high-performance cables for connecting AV equipment to the **VS-48HDCPxl.**

Step 4: Connect the power

Connect the power cord to the **VS-48HDCPxl** and plug it into the mains electricity.

Step 5: Operate the VS-48HDCPxl

Acquire the EDID from a connected output

1. Press and hold the EDID and STO buttons for 3 seconds. Both buttons flash.
2. Press the INPUT button that receives the EDID. The input number flashes on display.
3. Press the OUTPUT button where the display is connected.
4. Press the EDID button.
5. When the buttons stop flashing and the display returns to normal, the EDID is acquired.

Switch an input to an output

Press an output button followed by an input button to switch the pair

Store a preset

1. Set the device to the desired I/O setting.
2. Press the STO button. The STO button flashes.
3. Select an IN or OUT button to store the device setting.
4. Press the STO button to store the current setup.

Recall a preset

1. Press the RCL button. The RCL button flashes.
2. Press the relevant IN or OUT button.
3. Press the RCL button to recall the stored setting.

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

Our 1,000-plus different models now appear in 11 groups that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters and GROUP 11: Sierra Products.

Congratulations on purchasing your Kramer **VS-48HDCPxl** *4x8 DVI Matrix Switcher*, which is ideal for the following typical applications:

- Conference room presentations
- Advertising
- Rental and staging

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual

Go to http://www.kramerelectronics.com/support/product_downloads.asp to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

2.1 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Do not secure the cables in tight bundles or roll the slack into tight coils
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality
- Position your Kramer **VS-48HDCPxl** away from moisture, excessive sunlight and dust

This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.

2.2 Safety Instructions

Caution: There are no operator serviceable parts inside the unit

Warning: Use only the power cord that is supplied with the unit

Warning: Do not open the unit. High voltages can cause electrical shock! Servicing by qualified personnel only

Warning: Disconnect the power and unplug the unit from the wall before installing

2.3 Recycling Kramer Products

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC aims to reduce the amount of WEEE sent for disposal to landfill or incineration by requiring it to be collected and recycled. To comply with the WEEE Directive, Kramer Electronics has made arrangements with the European Advanced Recycling Network (EARN) and will cover any costs of treatment, recycling and recovery of waste Kramer Electronics branded equipment on arrival at the EARN facility. For details of Kramer's recycling arrangements in your particular country go to our recycling pages at *http://www.kramerelectronics.com/support/recycling/*.

3 Overview

The high quality Kramer **VS-48HDCPxl** is an HDCP compatible 4 x 8 DVI Matrix Switcher that accepts up to four DVI inputs and routes the selected DVI input signal to any or all of eight DVI outputs.

Note that only the digital signal (DVI D) is available on the DVI connector.

The **VS-48HDCPxl** features:

- Max. Data Rate - 6.75Gbps (2.25Gbps per graphic channel)
  Suitable for resolutions up to UXGA at 60Hz, and for all HD resolutions
- HDTV Compatibility
- HDCP Compliance
- HDMI Support for Deep Color, x.v.Color™, 3D Pass-Through, HDMI Compressed Audio Channels
- Input/Output - DVI-D signals (on DVI-I connectors)
- Kramer Equalization and re-Klocking™ Technology - Rebuilds the digital signal integrity to travel longer distances
- I-EDIDPro™ Kramer Intelligent EDID Processing™ - Intelligent EDID handling & processing algorithm ensures Plug and Play operation for DVI systems
- Fast Switching Technology - Reduces switching delay between DVI/HDMI sources
- Output Disconnect - Each output
- Front Panel Lockout
- Memory Locations - Stores multiple switches as presets to be recalled and executed when needed
- Worldwide Power Supply - 100-240V AC
- Standard 19-inch Rack Mount Size - 2U. Rack “ears” included

You can control the **VS-48HDCPxl** using the front panel buttons or remotely via:

- RS-232 serial commands transmitted by a touch screen system, PC or other serial controller
- The Kramer infrared remote control transmitter
- The Ethernet port

3.1 Defining the VS-48HDCPxl 4x8 DVI Matrix Switcher

This section defines the **VS-48HDCPxl**.

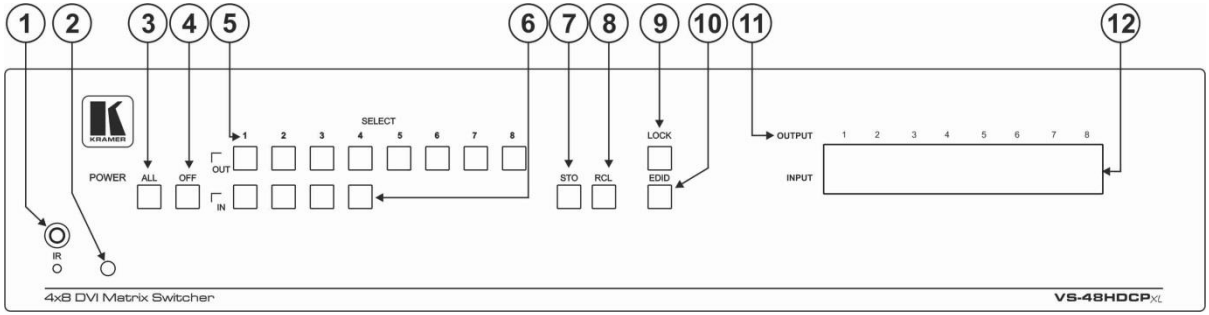


Figure 1: VS-48HDCPxl 4x8 DVI Matrix Switcher Front Panel

#	Feature	Function
1	*IR* Receiver and LED	IR remote control sensor. LED lights yellow when receiving an IR signal
2	*POWER* LED	Lights green when the unit is turned on
3	*ALL* Button	Press to select all inputs or all outputs (see Section 6.1)
4	*OFF* Button	Press to disconnect one or all outputs (see Section 6.2)
5	*SELECT OUT* Buttons	Press to select an output (from 1 to 8)
6	*SELECT IN* Buttons	Press to select an input (from 1 to 4)
7	*STO* Button	Press to store a switching configuration
8	*RCL* Button	Press to recall a switching configuration
9	*LOCK* Button	Press and hold to lock the front panel buttons and to acquire the EDID (see Section 6.5). Press and hold a second time to unlock the front panel buttons
10	*EDID* Button	Press to acquire the EDID
11	*OUTPUT* 1 to 8	Indicates the output channels and their respective input selections on the 7-segment display
12	*INPUT* 7-segment Display	Number shown on the display indicates the relevant input channel

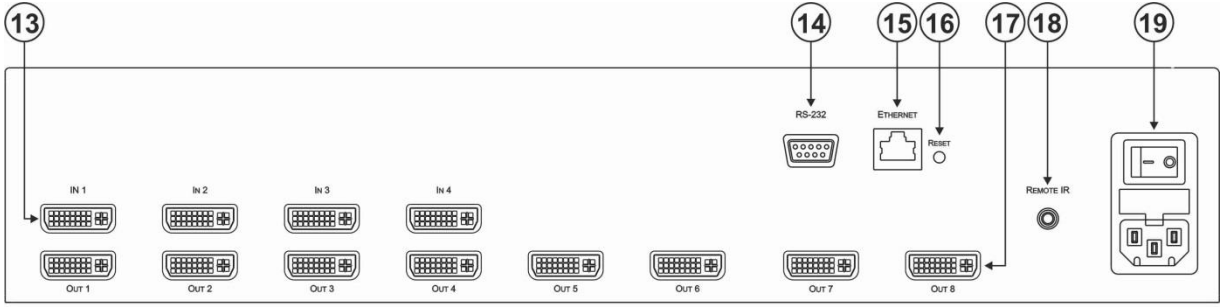


Figure 2: VS-48HDCPxl 4x8 DVI Matrix Switcher Rear Panel

#	Feature	Function
13	*INPUT* DVI Connectors	Connect to the DVI sources (from 1 to 4)
14	*OUTPUT* DVI Connectors	Connect to the DVI acceptors (from 1 to 8)
15	*RS-232* 9-pin D-sub (F) Connector	Connects to a PC or the serial remote controller (see Section 8)
16	*ETHERNET* RJ-45 Connector	Connects to a PC or other Ethernet controller via a LAN (see Section 8)
17	*RESET* Button	Press and hold to reset the Ethernet configuration to its factory default values (see Section 8)
18	*REMOTE IR* 3.5mm Mini Jack	Connects to an external IR receiver unit for controlling the machine via an IR remote controller (instead of using the front panel IR receiver), see Section 3.2
19	Mains Power Connector with Switch and Fuse	Connects to the AC mains supply and switches the unit on or off

3.2 Using the IR Transmitter

You can use the **RC IR3** IR transmitter to control the machine via the built-in IR receiver on the front panel or, instead, via an optional external IR receiver (Model: C-A35M/IRR-50). The external IR receiver can be located up to 15 meters away from the machine. This distance can be extended to up to 60 meters when used with three extension cables (Model: C-A35M/A35F-50).

Before using the external IR receiver, be sure to arrange for your Kramer dealer to insert the internal IR connection cable (P/N: 505-70434010-S) with the 3.5mm connector that fits into the REMOTE IR opening on the rear panel. Connect the external IR receiver to the REMOTE IR 3.5mm connector.

4 Installing in a Rack

Before installing in a rack, be sure that the environment is within the recommended range:

OPERATING TEMPERATURE:	0º to +40ºC (32º to 104ºF)
STORAGE TEMPERATURE:	-40º to +70ºC (-40º to 158ºF)
HUMIDITY:	10% to 90%, RHL non-condensing

CAUTION!

When installing on a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.

2. Once rack mounted, enough air will still flow around the machine.

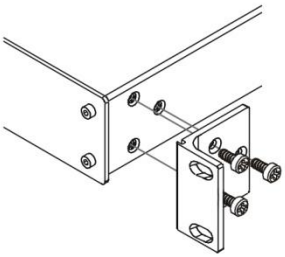
3. The machine is placed straight in the correct horizontal position.

4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.

5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note:

- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions available from our Web site

5 Connecting the VS-48HDCPxl

Always switch off the power to each device before connecting it to your **VS-48HDCPxl**. After connecting your **VS-48HDCPxl**, connect its power and then switch on the power to each device.

To connect the **VS-48HDCPxl** as illustrated in the example in Figure 3:

1. Connect up to four DVI sources (for example, DVD players) to the IN DVI connectors.
2. Connect the OUT DVI connectors to up to eight DVI acceptors (for example, DVI displays).
3. If required, connect a PC and/or controller to the RS-232 port (see Section 5.1) and/or the Ethernet port (see Section 5.2).
4. If required, acquire the EDID (see Section 6.4).

The power cord is not shown in Figure 3.

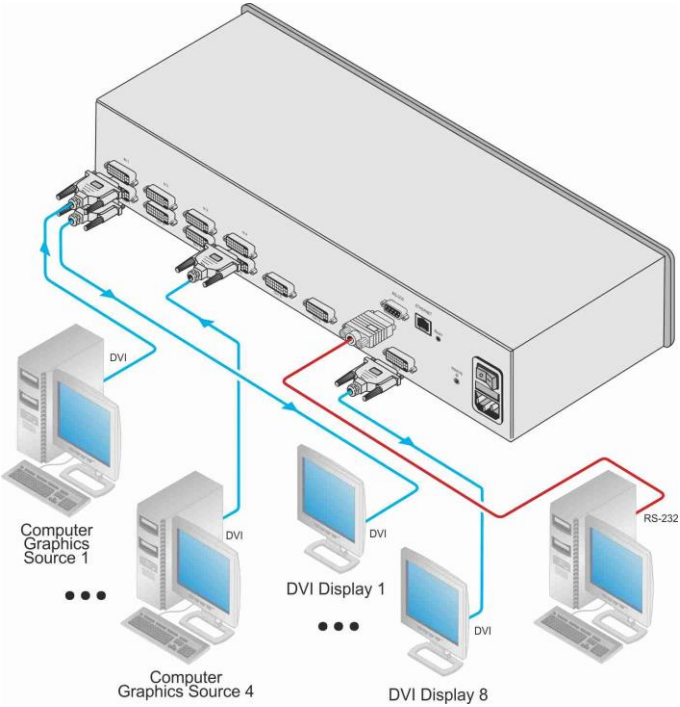


Figure 3: Connecting the VS-48HDCPxl 4x8 DVI Matrix Switcher

5.1 Connecting to the VS-48HDCPxl via RS-232

You can connect to the **VS-48HDCPxl** via an RS-232 connection using, for example, a PC. Note that a null-modem adapter/connection is not required.

To connect to the **VS-48HDCPxl** via RS-232:

- Connect the RS-232 9-pin D-sub rear panel port on the **VS-48HDCPxl** unit via a 9-wire straight cable (only pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5 need to be connected) to the RS-232 9-pin D-sub port on your PC

5.2 Operating via Ethernet

You can connect to the **VS-48HDCPxl** via Ethernet using either of the following methods:

- Directly to the PC using a crossover cable (see Section 5.2.1)
- Via a network hub, switch, or router, using a straight-through cable (see Section 5.2.2)

Note: If you want to connect via a router and your IT system is based on IPv6, speak to your IT department for specific installation instructions.

After connecting the Ethernet port, you have to install and configure your Ethernet Port. For detailed instructions, see the "Ethernet Configuration (FC-11) guide.pdf" file in the technical support section at http://www.kramerelectronics.com/support/faq.asp.

5.2.1 Connecting the Ethernet Port directly to a PC

You can connect the Ethernet port of the **VS-48HDCPxl** directly to the Ethernet port on your PC using a crossover cable with RJ-45 connectors.

This type of connection is recommended for identifying the **VS-48HDCPxl** with the factory configured default IP address.

After connecting the **VS-48HDCPxl** to the Ethernet port, configure your PC as follows:

1. Click **Start** > **Control Panel** > **Network and Sharing Center**.
2. Click **Change Adapter Settings**.
3. Highlight the network adapter you want to use to connect to the device and click **Change settings of this connection**.
   The Local Area Connection Properties window for the selected network adapter appears as shown in Figure 4.

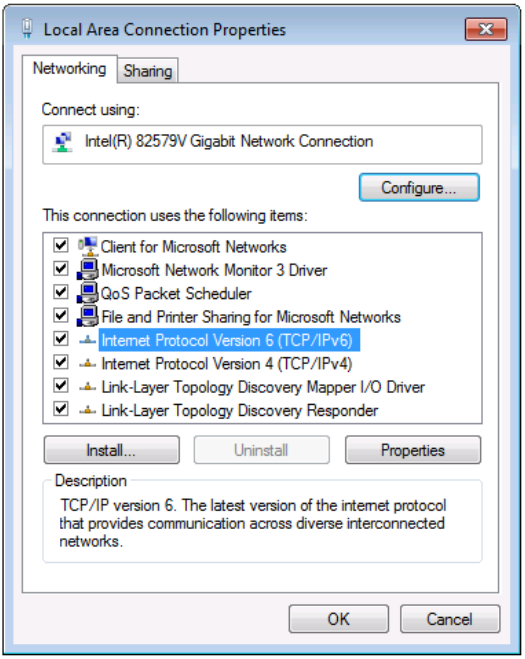


Figure 4: Local Area Connection Properties Window

4. Highlight either **Internet Protocol Version 6 (TCP/IPv6)** or **Internet Protocol Version 4 (TCP/IPv4)** depending on the requirements of your IT system.

5. Click **Properties**.
   The Internet Protocol Properties window relevant to your IT system appears as shown in Figure 5 or Figure 6.

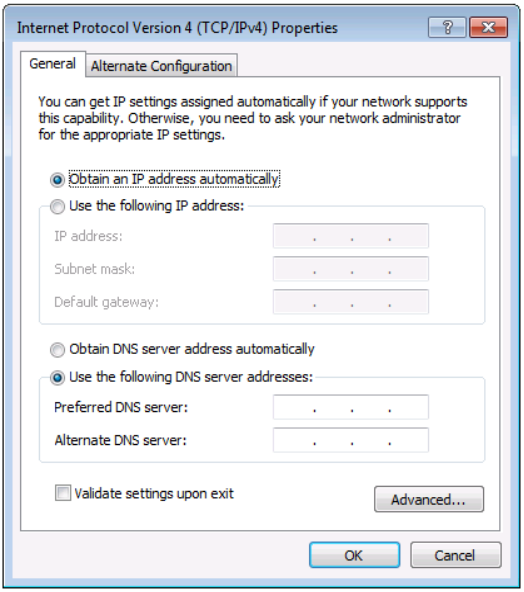

Internet Protocol Version 4 (TCP/IPv4) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

Figure 5: Internet Protocol Version 4 Properties Window

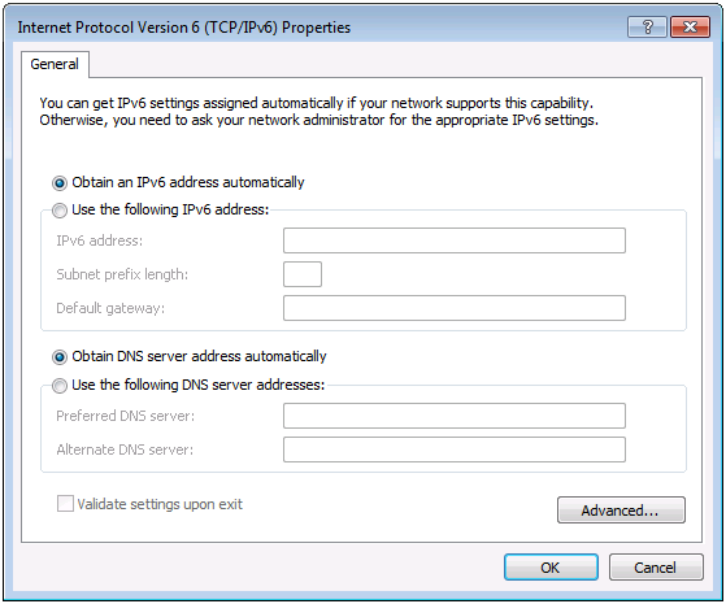

Internet Protocol Version 6 (TCP/IPv6) Properties
General
You can get IPv6 settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IPv6 settings.
Obtain an IPv6 address automatically
Use the following IPv6 address:
IPv6 address:
Subnet prefix length:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

Figure 6: Internet Protocol Version 6 Properties Window

6. Select **Use the following IP Address** for static IP addressing and fill in the details as shown in Figure 7.
   For TCP/IPv4 you can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.

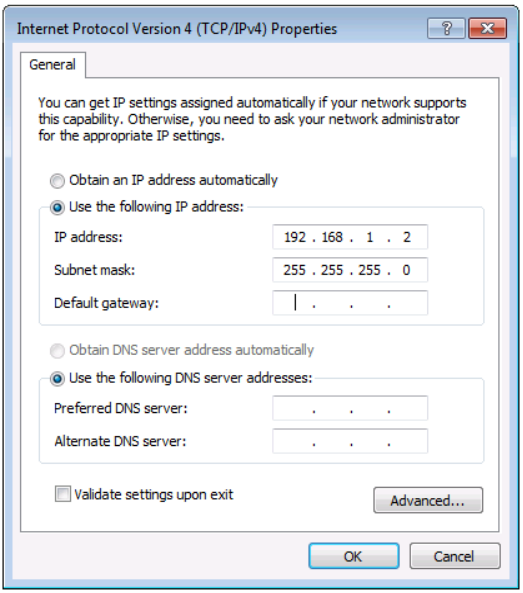

Internet Protocol Version 4 (TCP/IPv4) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 1 . 2
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

Figure 7: Internet Protocol Properties Window

7. Click **OK**.

8. Click **Close**.

5.2.2 Connecting the Ethernet Port via a Network Hub or Switch

You can connect the Ethernet port of the **VS-48HDCPxl to** the Ethernet port on a network hub or using a straight-through cable with RJ-45 connectors.

5.2.3 Control Configuration via the Ethernet Port

To control several units via Ethernet, connect the Master unit (Device 1) via the Ethernet port to the Ethernet port of your PC. Use your PC provide initial configuration of the settings (see Section 5.2).

6 Operating the VS-48HDCPxl 4x8 DVI Matrix Switcher

This section describes how to:

- Route inputs to outputs (see Section 6.1)
- Disconnect outputs (see Section 6.2)
- Store and recall a setup (see Section 6.3)
- Acquire the EDID (see Section 6.4)
- Lock and unlock the front panel (see Section 6.5)
- Reset the Ethernet configuration to default values (see Section 6.6)
- Control the machine via the Ethernet port (see Section 6.7)

6.1 Routing Inputs to Outputs

To route an input to an output:

- Press an OUT key, followed by an IN key to route this input to that output

To route one input to all outputs:

- Press ALL followed by an IN button. The input is routed to all outputs

6.2 Disconnecting the Outputs

To disconnect one output:

- Press the OUT button of the output to disconnect and press OFF

To disconnect all outputs at once:

- Press the ALL button and then press OFF. This disconnects all the outputs

6.3 Storing and Recalling a Setup

You can use the STO and RCL buttons to store up to 12 setups and then recall them as illustrated in Figure 8.

IN 1 is used for setup number 1 and OUT 1 is used for setup number 5.

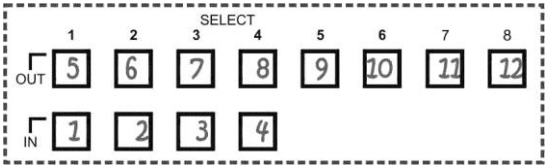


Figure 8: SELECTOR Buttons

The gray numbers (1 to 12) in Figure 8 that illustrate the corresponding store/recall configuration numbers are for the purpose of illustration only and do not actually appear on the buttons.

To store a setup (for example, to preset 10):

1. Configure the switching as required for the preset
2. Press the STO button.
   The STO button flashes.
3. Select an OUT or IN SELECT button to store the machine setup (for example, OUT 6 for preset 10).
4. Press the STO button to store the current setup.
   In this example, the OUT 6 button stores the setup.
   Press the STO button within 10 seconds as the store operation times out automatically after this period.

To recall a setup (for example, from preset 10):

1. Press the RCL button.
   The RCL button flashes.
2. Press the relevant OUT or IN button that stored the setup.
   In this example, press OUT 6 for preset 10.
3. Press the RCL button to recall the stored setup.

6.4 Acquiring the EDID

You can acquire the EDID from:

- One output set to one or more of the four inputs (see Section 6.4.1)
- Different outputs set to different inputs (see Section 6.4.2)
- The default EDID (see Section 6.4.3)

6.4.1 Acquiring an EDID from a Single Connected Output

To acquire or change the EDID of a new output display:

1. Connect the required acceptor to the output from which you want to acquire the EDID.
2. Press the EDID and STO buttons simultaneously and hold them for 3 seconds.
   Both buttons flash.
3. Press the IN SELECT button to which the EDID is to be copied.
   The selected input number flashes on the display.
4. Select the OUT SELECT button from which the EDID is to be acquired.
5. Press the EDID button.
   The EDID has been captured when the display returns to normal.

6.4.2 Acquiring an EDID from Several Sets of Inputs and Outputs

To acquire the EDID from several sets of inputs and outputs (for example, OUT 1 to IN 1 and OUT 6 to IN 3):

1. Connect the required acceptors to the outputs from which you want to acquire the EDID.
2. Press the EDID and STO buttons simultaneously and hold them for 3 seconds.
   Both buttons flash.

3. Press the SELECT IN button to which the first EDID is to be copied (for example, IN 1).
   The selected input number flashes on the display.

4. Press the SELECT OUT button from which the first EDID is to be acquired (for example, OUT 1).

5. Press the SELECT IN 1 button again.
   The IN 1 button stops flashing.

6. Press another SELECT IN to which the next EDID is to be copied (for example, IN 3).
   The selected input number flashes on the display.

7. Press the SELECT OUT button from which the next EDID is to be acquired (for example, OUT 6).

8. Press the SELECT IN 3 button again.
   The IN 3 button stops flashing.

9. Press the SELECT IN buttons to which you want to copy the EDID (for example, IN 1 and IN 3).

10. Insure that the relevant input numbers flash on the display.

11. Press the EDID button.
    The process is complete when the display returns to normal.

6.4.3 Acquiring the Default EDID

To reset to the default EDID:

1. Press the EDID and STO buttons simultaneously and hold them for 3 seconds.
   Both buttons flash.

2. Press the SELECT IN button to which the EDID will be copied.
   The selected input number flashes on the display.

3. Press the OFF button until a "0" (zero) appears on the display.

4. Press the EDID button.
   The process is complete when the display returns to normal.

6.5 Locking and Unlocking the Front Panel

To prevent unintended tampering with the unit via the front panel buttons, lock your **VS-48HDCPxl**.

To lock the **VS-48HDCPxl:**

- Press the PANEL LOCK button on the front

6.6 Resetting the Ethernet Configuration to Default Values

Power cycle the unit while holding in the Factory Reset button, located on the rear panel of the unit.

6.7 Controlling Configuration via the Ethernet Port

To control several units via Ethernet, connect the Master unit (Machine # 1) Ethernet port on your PC. Use your PC to configure the initial settings (see Section 5.1).

6.8 Firmware Upgrade

Instructions for upgrading the firmware can be found in the *STC Firmware Upgrade* document.

7 Technical Specifications

INPUTS:	4 DVI connectors
OUTPUTS:	8 DVI connectors
MAX. DATA RATE:	6.75Gbps (2.25Gbps per graphic channel)
COMPLIANCE WITH STANDARDS:	Supports DVI and HDCP
MAX RESOLUTION:	Up to UXGA; 1080p
POWER CONSUMPTION:	100–240VAC; 50/60Hz, 38VA
CONTROLS:	Front panel buttons, infrared remote control transmitter, RS-232, Ethernet
OPERATING TEMPERATURE:	0° to +40°C (32° to 104°F)
STORAGE TEMPERATURE:	-40° to +70°C (-40° to 158°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	19" x 9.3" x 2U W, D, H
WEIGHT:	2.5kg (5.5lbs) approx.
ACCESSORIES:	Power cord, IR transmitter, rack “ears”
OPTIONS:	External remote IR receiver cable
Specifications are subject to change without notice at http://www.kramerelectronics.com	

8 Default Communication Parameters

RS-232 Protocol 2000	
Baud Rate:	9600
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	HEX
Example (Output 1 to Input 1):	0x01, 0x81, 0x81, 0x81
Ethernet	
IP Address:	192.168.1.39
TCP Port Number:	5000
Network Mask:	255.255.255.0
Default Gateway:	192.168.1.1

9 Kramer Protocol 2000

The Kramer Protocol 2000 RS-232/RS-485 communication uses four bytes of information as defined below.

MSB							LSB
	DESTINATION	INSTRUCTION					
0	D	N5	N4	N3	N2	N1	N0
7	6	5	4	3	2	1	0
1st byte							
	INPUT						
1	I6	I5	I4	I3	I2	I1	I0
7	6	5	4	3	2	1	0
2nd byte							
	OUTPUT						
1	O6	O5	O4	O3	O2	O1	O0
7	6	5	4	3	2	1	0
3rd byte							
			MACHINE NUMBER				
1	OVR	X	M4	M3	M2	M1	M0
7	6	5	4	3	2	1	0
4th byte							

1st BYTE: Bit 7 – Defined as 0.
D – "DESTINATION": 0 - for sending information to the switchers (from the PC);
1 - for sending to the PC (from the switcher).
N5…N0 – "INSTRUCTION"
The function that is to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the INSTRUCTION NO., which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5…N0).

2nd BYTE: Bit 7 – Defined as 1.
I6…I0 – "INPUT".
When switching (ie. instruction codes 1 and 2), the INPUT (7 bits) is set as the input number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the INPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

3rd BYTE: Bit 7 – Defined as 1.
O6…O0 – "OUTPUT".
When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the OUTPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

4th BYTE: Bit 7 – Defined as 1.
Bit 5 – Don't care.
OVR – Machine number override.
M4…M0 – MACHINE NUMBER.
Used to address machines in a system via their machine numbers. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number. If the OVR bit is set, then all machine numbers accept (implement) the command, and the addressed machine replies. For a single machine controlled via the serial port, always set M4…M0 = 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

All the values in the table are decimal, unless otherwise stated

Instruction Codes for Protocol 2000				
Instruction		**Definition for Specific Instruction**		**Notes**
#	**Description**	**Input**	**Output**	
0	RESET VIDEO	0	0	1
1	SWITCH VIDEO	Set equal to video input which is to be switched (0 = disconnect)	Set equal to video output which is to be switched (0 = to all the outputs)	2, 15
3	STORE VIDEO STATUS	Set as SETUP #	0 - to store 1 - to delete	2, 3, 15
4	RECALL VIDEO STATUS	Set as SETUP #	0	2, 3, 15
5	REQUEST STATUS OF A VIDEO OUTPUT	Set as SETUP #	Equal to output number whose status is required	4, 3
15	REQUEST WHETHER SETUP IS DEFINED / VALID INPUT IS DETECTED	SETUP # or Input #	0 - for checking if setup is defined 1 - for checking if input is valid	8
30	LOCK FRONT PANEL	0 - Panel unlocked 1 - Panel locked	0	2
31	REQUEST WHETHER PANEL IS LOCKED	0	0	16
61	IDENTIFY MACHINE	1 - video machine name 2 - audio machine name 3 - video software version 4 - audio software version 5 - RS422 controller name 6 - RS422 controller version 7 - remote control name 8 - remote software version 9 - Protocol 2000 revision	0 - Request first 4 digits 1 - Request first suffix 2 - Request second suffix 3 - Request third suffix 10 - Request first prefix 11 - Request second prefix 12 - Request third prefix	13
62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs 3 - number of setups	1 - for video 2 - for audio 3 - for SDI 4 - for remote panel 5 - for RS-422 controller	14

NOTES on the above table:

NOTE 1 - When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it resets according to the present power-down settings.

NOTE 2 - These are bi-directional definitions. That is, if the switcher receives the code, it performs the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if the HEX code
01 85 88 83
was sent from the PC, then the switcher (machine 3) switches input 5 to output 8. If the user switched input 1 to output 7 via the front panel keypad, then the switcher sends HEX codes:
41 81 87 83
to the PC.
When the PC sends one of the commands in this group to the switcher, then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it was sent (except for the first byte, where the DESTINATION bit is set high).

NOTE 3 - SETUP # 0 is the present setting. SETUP # 1 and higher are the settings saved in the switcher's memory, (i.e. those used for Store and Recall).

NOTE 4 - The reply to a "REQUEST" instruction is as follows: the same instruction and INPUT codes as were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The replies to instructions 10 and 11 are as per the definitions in instructions 7 and 8 respectively. For example, if the present status of machine number 5 is breakaway setting, then the reply to the HEX code
0B 80 80 85
would be HEX codes
4B 80 81 85

NOTE 8 - The reply is as in TYPE 3 above, except that here the OUTPUT is assigned with the value 0 if the setup is not defined / no valid input is detected; or 1 if it is defined / valid input is detected.

NOTE 13 - This is a request to identify the switcher/s in the system. If the OUTPUT is set as 0, and the INPUT is set as 1, 2, 5 or 7, the machine sends its name. The reply is the decimal value of the INPUT and OUTPUT. For example, for a 2216, the reply to the request to send the audio machine name would be (HEX codes):

7D	96	90	81 (i.e. 128dec+ 22dec for 2nd byte, and 128dec+ 16dec for 3rd byte).

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine sends its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number after it. For example, for version 3.5, the reply to the request to send the version number would be (HEX codes):

7D	83	85	81 (i.e. 128dec+ 3dec for 2nd byte, 128dec+ 5dec for 3rd byte).

If the OUTPUT is set as 1, then the ASCII coding of the lettering following the machine's name is sent. For example, for the VS-7588YC, the reply to the request to send the first suffix would be (HEX codes):

7D	D9	C3	81 (i.e. 128dec+ ASCII for "Y"; 128dec+ ASCII for "C").

NOTE 14 - The number of inputs and outputs refers to the specific machine which is being addressed, not to the system. For example, if six 16X16 matrices are configured to make a 48X32 system (48 inputs, 32 outputs), the reply to the HEX code

3E	82	81	82 (ie. request the number of outputs)

would be HEX codes

7E	82	90	82

ie. 16 outputs

NOTE 15 – When the OVR bit (4th byte) is set, then the "video" commands have universal meaning. For example, instruction 1 (SWITCH VIDEO) causes all units (including audio, data, etc.) to switch. Similarly, if a machine is in "FOLLOW" mode, it performs any "video" instruction.

NOTE 16 - The reply to the "REQUEST WHETHER PANEL IS LOCKED" is as in NOTE 4 above, except that here the OUTPUT is assigned with the value 0 if the panel is unlocked, or 1 if it is locked.

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SAFETY WARNING
Disconnect the unit from the power supply before opening and servicing

P/N: 2900-300015 Rev: 5